AMERICAN JOURNAL OF PUBLIC HYGIENE
AND
JOURNAL OF THE
MASSACHUSETTS ASSOCAITION OF BOARDS OF HEALTH

ORGANIZED 1890.

[The Association as a body is not responsible for statements or opinions of any of its members.]

VOL. XV. (New Series. Vol. II., No. 1.) November, 1905. NO. 4

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, with the following objects; The advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations

THE JOURNAL OF THIS ASSOCIATION has for fifteen years faithfully reflected the views of the public hygienists of Massachusetts. With the November issue of the year 1904, the encouragement received from many hygienic quarters induced the Association to undertake the expansion of the Journal to a national standard, with the co-operation of many noted sanitarians as editors. A new title was selected, while the older and well-established title was retained also.

The dates of publication are FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, papers contributed by hygienists, reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 per year. Reprints furnished at cost price.

All communications concerning the JOURNAL, copy, proof, subscriptions, advertisements, etc., should be addressed to the Managing Editor, DR. H. W. HILL, 739 BOYLSTON ST., BOSTON, MASS.

All communications concerning the ASSOCIATION should be addressed ta the Secretary of the Association, JAMES C. COFFEY CITY HALL, WORCESTER, MASS.

All bills not relating to the Journal, and MEMBERSHIP DUES ($2.00 per year), should be sent to the Treasurer of the Association, DR. JAMES B. FIELD, 329 WESTFORD ST., LOWELL, MASS.

EDITORIALS.

THE WRITING OF HEALTH REPORTS.

The time is approaching when it will be necessary for health officers to prepare their annual reports. These reports are nominally made to some superior officer, or to town or city councils. Their real purpose is to supply information to all the citizens concerning the workings of the department. They also furnish information to health officers in other cities, so that each community can make use of whatever methods have proved valuable elsewhere.

Unfortunately a good many health reports are carelessly prepared and are of little use to anyone. Whoever consults a health report, whether it be a citizen of one's own town or a brother health officer, should be able to easily find what is wanted. Everything should be as clear as possible and without ambiguity; hence, it is often necessary to define the terms that are used, and to take great care in the headings of tables, or in the explanation of methods pursued. For instance, it is a very common thing to read that so many loads of garbage were removed during the year. But the word "garbage" has very different meanings in different places, and even in one's own city the great majority of the citizens do not know what would be included in the term. Unless we know the size of the load there is no use whatever in stating the number removed. It is important to follow the same arrangement of subjects in every report, so that in looking over the reports it will be easy to find what is wanted.

It is very desirable that a list of all the officers and employees should be given. If there are many of the latter, of course the names need not be given, but merely the number. One of the most common inquiries is, how many are em-

ployed, what positions do they hold, and what are they paid? The latter should be indicated in the financial statement. It is a good plan, if possible, to describe very briefly under each department the main features of the work. This can be often done each year without taking very much space, and without much trouble, and is of great assistance to anyone seeking for this information. Another plan is to describe each year with great fullness some branch of sanitary work, and then to give the reference to this in some subsequent reports. It may be suggested that these descriptions will draw too heavily upon the printing fund, but in many cases by leaving out platitudes about municipal cleanliness, the triumphs of hygiene and the prospect of stamping out infectious disease, sufficient space could be saved for really useful descriptions of department work.

One very annoying thing in health reports is the absence of tables giving figures for a series of years. Almost everyone who takes up a health report wants to know not merely the deaths, cases of contagious disease, nuisances, food inspections, sputum examinations, milk analyses, prosecutions, amount of garbage removed, expenses, etc., for a single year, but he wants to compare them for a series of years, and tables showing these facts should be included in each report. Most of these tables, particularly those relating to infectious diseases and deaths, should go back as far as data are available, yet it is surprising to find how many of these tables in municipal reports are imperfect, or entirely wanting. In many health reports it is customary to exhibit deaths or cases of sickness by words, months, or in some other detailed manner. Yet I have not unfrequently found in such reports failure to give totals, so that if a person wanted to find out the number of cases in a given year he would have to add up the numbers for perhaps a dozen wards.

A great deal of really important scientific work is done by very many health officers, but it counts for nothing, because it is not properly preserved and made accessible to others.

Investigations of outbreaks of infectious disease should always be recorded with great care. Many such have been made in Massachusetts, and some of them are properly noted in local health reports, but many more are recorded imperfectly, or are not mentioned at all. Data in regard to sources of infection, duration of incubation, immunity to second attacks, persistence of infection, the occurrence of return cases after hospital isolation or after disinfection, the transferrence of infection by third persons, or by fomites, are all matters of very great moment. We need to know much more than we do about them all. Facts concerning some or all of them come to the notice of almost every health officer, and he should record them so as to increase the number and value of the data on which our future practice must be based. Every health officer should and usually does do something in the way of observation or experiment to increase the sum of sanitary knowledge, and he should record it carefully in his reports, and by so doing he will help others, and will make his future work still more accurate.

In some cities the vital statistics are published in a separate report; in such cases at least the gross death rate, and perhaps the death rate from some of the more important diseases should be included in the health report proper. In most cities, however, the health report includes at least the statistics of deaths. As a rule, these are extremely unsatisfactory. There is no excuse now for using any classification except the Bertillon, yet in many reports the causes of death will be found arranged alphabetically, and in others according to Farr's classification. When deaths are given with some detail as to seasonal or age distribution, as was suggested above, the total should always be given also. It is important to make use of ratios as much as possible, thus the death rate per one hundred thousand living, for the different causes, should be given. This is rarely done, and it detracts greatly from the value of the report. So in tables of age and seasonal distribution the percentage of deaths occurring during

any one month or at any one age are useful. It is also important to give the total deaths and death rates for a period of years, and the same data for the principal causes of death for a series of years.

A good statement of the expenditures and receipts should form a part of every report. It is important to classify the expenditures as carefully as possible, so as to know just what is spent for disinfection, for laboratory work, for the control of contagious diseases, for the abatement of nuisances, etc. The same classification should be followed each year. Most reports err either in not having sufficient detail, or in having too much. No one cares to whom money is paid, or from whom it is received, but what they want to know is just how much is spent along certain definite lines. Unless there are strong local reasons why it should not be done, the salaries of the different officials should be shown in the financial statement.

If a health report covers more than fifty pages it should have an index, or at least a table of contents.

The great majority of American health reports are octavo, and all ought to be. It is a convenient size, and uniformity is desirable. Lastly, a report should be mailed in an envelope. No suitable punishment has yet been devised for the man who will roll up for mailing a health report, or any other pamphlet or manuscript. Health officers should look after their mailing lists and exchanges.

CHARLES V. CHAPIN.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The recent meeting of the American Public Health Association in Boston was prolific in developments relating to the future of professional public hygiene in this country. Hitherto public hygiene has had scant recognition as a distinct profession—hardly has it been generally regarded even as an

expert specialty. The address of the president, Dr. F. F. Wesbrook of Minneapolis ("Co-ordinated Specialism in Public Health Works"), was directed especially to emphasizing the importance of a general acceptance of public hygiene as a profession, related to, but distinct from, the practice of medicine. Inasmuch as the association took action by the appointment of a committee to consider and report on the suggestions made in this address, it is likely that a definite rearrangement of the relations of public hygiene to medical practice may be looked for in the near future. The committee is composed of well-known public hygienists, representing many phases of public health, and can be trusted as at once progressive and conservative in due proportions. The ex-officio members are the president-elect, Prof. F. C. Robinson, Bowdoin College, Brunswick, Me.; the chairman of the Laboratory Section, H. W. Clark, Massachusetts State Board of Health, Boston; and the secretary of the association, Dr. C. O. Probst, Ohio State Board of Health, Columbus, Ohio.

The appointive members are: Dr. H. M. Bracken, Minnesota State Board of Health, Minneapolis, Minn., chairman; Dr. Henry Mitchell, secretary New Jersey State Board of Health, Trenton, N. J., and Dr. H. D. Pease, director New York State Antitoxin Laboratory, Albany, N. Y.

The following instructions to the committee contain the recommendations which are to be considered:

The committee shall arrange and cause to be forwarded to each member of the association the grouping of programme material by March 1, 1906, and shall cause to be forwarded printed abstracts of papers and the final detailed programme not later than three weeks prior to the date of the next annual meeting, to all members of the association.

With the final programme and the abstracts shall be sent a printed draft of the committee's recommendations concerning the mechanism, including the exact wording of changes in constitution or by-laws which seems necessary or expedient, whereby the following improvements may be ensured:

(a) A board of trustees or small committee, representing the various phases of public health work, to conduct the necessary business of the association immediately before and after, and also between annual meetings.

(b) To increase the revenue of the association.

(c) To establish a permanent office or headquarters.

(d) To take charge of, print and distribute programmes and synopses of papers at the expense of the association, so that all members may be familiar with the plans of the association some weeks before the annual meeting.

(e) To publish the proceedings of the association and all its sections promptly.

(f) To publish a journal of hygiene and to promote a universal use by all State and provincial boards of health of the material contained therein. This shall be representative of all the interests of the association and contain the latest scientific material and standard methods in relation to practical application.

(g) To see that all Federal, State and Provincial Boards of Health and the Federal Sanitary and Medical Services are requested and do furnish in writing proper credentials, so that the Advisory Council may be more definitely and equitably constituted. Provision for representation of large cities should be considered.

(h) To arrange for a rigid classification of the membership into active and associate members.

(i) To arrange for a more thorough scrutiny of the qualifications of applicants for membership.

(j) To determine a policy in relation to the examination and granting of a diploma of public health by this association.

(k) To determine the feasibility and method of incorporating the Conference of State and Provincial Boards of Health as a Section of our association.

(l) To provide, if necessary, a municipal health officer

section and such other sections as seem to be desirable.

(m) To formulate methods of influencing localities to a greater conservation and permanency of organization in their sanitary work and in their representation in our association.

OCTOBER QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Massachusetts Association of Boards of Health was held on Thursday, October 26, 1905, at the Hotel Brunswick, Boston. President Walcott presided, and about 90 members were present.

The records of the July meeting were read and approved.

Upon the recommendation of the Executive Committee, the following gentlemen were elected to membership:

P. M. Harwood, General Agent of the Dairy Bureau, State Board of Agriculture.

Dr. Allen F. Barnes, Bacteriologist, Cambridge Board of Health.

Dr. Henry J. Barnes, Boston, Professor of Hygiene in the Tufts Medical College.

Dr. A. Small, of Clinton.

THE PRESIDENT: A committee of your Association submits to the Association the following report:

Whereas, at the close of a long, completed life, Dr. Samuel W. Abbott has been removed from our midst, we, his associates, members of the Massachusetts Association of Boards of Health, desire to express our appreciation of him as a man, accomplished in matters pertaining to the public health, untiring in his work, and devoted to the interests of this Association.

We realize keenly the loss to this organization in the death of its Vice-President, who held this office since its formation.

Kindly, honest and upright in his dealings, careful and painstaking in his investigations and conclusions, his record as a member of this Association is an example to emulate.

HERBERT C. EMERSON,
JAMES C. COFFEY.

This resolution was adopted unanimously.

THE PRESIDENT: The first paper upon your programme for this afternoon is upon "Rabies," by Dr. Langdon Frothingham, whom I now have the pleasure of presenting to you.

RABIES.

By Langdon Frothingham, D. V. M.
Austin Teaching Fellow, Harvard Medical School.

I believe that Aristotle was the first observer who left to the world a careful description of Rabies. This was four hundred years before the Christian era. Since then no treatise on medicine has omitted this disease from its covers, and yet there are people today who deny its existence. But there are also those who refuse to believe in smallpox or diphtheria, and still others who deny the existence of all disease. I sometimes wonder what the destiny of this last class would be, if they were compelled to live in a densely populated city, unsurrounded by the innumerable precautions of preventive medicine, unprotected by those guardian angels—the Boards of Health.

There is, perhaps, no disease which is so surrounded by myth and superstition as Rabies. Homer's reference to the Dog Star, or Orion's Dog, is the supposed origin of the belief that this disease occurs chiefly during the dog days, and that outbreaks at other seasons must be another malady. As a

matter of fact, statistics show that Rabies is just as prevalent in cold weather as in warm.

Pliny mentions a small worm in the dog's tongue, which, if removed when the animal is young, protects it against Rabies. Should this worm be carried three times about a fire and then given to persons bitten by a rabid dog, it prevents them from becoming mad. This process of "worming," absurd and cruel as it is, has come down to our own times.

A still very popular belief is, that if the dog is killed, the person bitten need have no fear of Rabies. Nothing could be more ridiculous. On the contrary, every effort should be made to keep the dog alive and under close observation in quarantine. Should he die of Rabies, the person bitten may then take the Pasteur preventive treatment, and animals which may have been exposed may be destroyed, or subjected to long quarantine. Should the dog, however, die of some other disease, or remain well, there is no danger to persons or animals bitten.

Rabies is an acute infectious disease, which may affect all animals, and even birds. I know of no warm-blooded creature which is naturally immune. It is more commonly observed in dogs, and the reasons for this are obvious. The saliva of this animal carries the infection, and it is, therefore, transmitted by his bite. The dog is by nature a biter. He bites without provocation and without discrimination, though other dogs are more prone to his attacks. Moreover, there is no animal with so many objectionable habits that is permitted such unbridled liberty. He walks about unmuzzled, unrestrained and unaccompanied, and often unlicensed and ownerless. A veritable vicious vagrant, it is small wonder that he suffers more than other animals from Rabies, and acts as the chief factor in spreading broadcast this terrible disease.

SYMPTOMS.—The symptoms of Rabies in the dog are manifold, and there is only time here to mention a few of the

most prominent. The first that is noticeable is a marked change in the natural temperament of the animal. This may be of almost any kind; for example, the lively, amiable dog may become dull and morose; the unaffectionate, fawning and demonstrative; the noisy, silent; the silent, noisy. There is apt to be great restlessness, moving about without fixed purpose, hiding in secluded spots, starting suddenly, listening to imaginary noises, or the eyes following phantom objects. A depraved appetite is usually present; the animal not only licks stones, metals and other cold objects, but he chews and swallows all kinds of foreign bodies, sticks, stones, straw, paper, pins, nails, etc., anything that comes within his reach. He may lick the place where he was bitten, and even gnaw it until it becomes raw and bleeding. There is at this time little or no disposition to bite. Any such symptoms as the above, or any evidence of mental disturbance, should be looked upon with suspicion in infected districts and warrant immediate isolation and strict quarantine.

The symptoms now assume one of two very definite characters, which has led to speaking of "furious" or "dumb" Rabies. The words explain themselves. In the furious form, the dog tends to roam and bite everything that comes in its path, more especially dogs and other animals. He bites without preliminary snarl or growl, and goes on to the next object, unless attacked in return. He develops a peculiar howl, something like the bay of a hound, which is said to be diagnostic by those who have once heard it. He may run for miles—fifty or more—spreading infection as he goes. Paralysis gradually ensues, beginning with the posterior extremities, and the animal soon dies, if not put to death by someone who has joined the chase. There is no hydrophobia or fear of water. The rabid dog will swim rivers and plunge its head into water, vainly endeavoring to drink, but, owing to a paralysis of certain muscles, it is unable to do so. When confined, and so prevented from wandering, paroxysms are interspersed with periods of torpor. Not uncommonly the dog

acts as if endeavoring to remove a bone or other foreign body from the throat.

The dumb or paralytic symptoms are usually first observed about the mouth. The lower jaw hangs partly open, limp and helpless. Saliva drools profusely from the lips. The mucous membrane of the mouth becomes bluish; there is no desire, and probably no ability, to bite. One can never forget the truly pitiful face, the imploring eyes gazing at their master, begging relief from an unknown horror. Paralysis soon shows itself in the hind legs and advancing forward, there is complete prostration and death in a few days.

Besides these typical forms there are, of course, intermediate grades tending either toward the furious or the reverse.

The symptoms in other animals are similar in a general way to those of the dog. They vary with the kind, nature and disposition of the animal affected. The horse may bite and kick; the cow may kick and horn; swine rush aimlessly about, squealing and biting. There is always evidence of great mental derangement. In man alone is there hydrophobia, and this is probably due to the fact that paralysis of certain muscles prevents him from drinking, and the attempt brings on a paroxysm.

INFECTION.—Rabies is usually transmitted by the bites of rabid wolves, or other wild animals, or of the dog. Infection does not always result from a bite. Bites upon the face, hands, or other exposed parts of the body are more likely to result disastrously than those inflicted through the clothing, since the passage of the teeth through any covering may clean them and wipe away the virus. For the same reason long-haired animals are more protected than short. A free flow of blood from a bite must also be looked upon as a safeguard against infection. "Under favorable circumstances, however, every bite infects." The disease may also be transmitted without the bite by particles of saliva coming in contact with abraded surfaces. It has been conveyed, experi-

mentally, by making animals breathe atomized, infectious fluids, and also by feeding infectious material.

The period of incubation varies very widely. The average time from infection to symptoms is between fifteen and sixty days, but it may be as short as ten days, and there is good reason to believe that symptoms may not appear for a year, or even longer, after a bite.

TREATMENT.—When symptoms have once set in, curative treatment is useless and almost criminal in the lower animals, when we consider the risk of preserving and propagating the infectious agent. Very exceptionally recovery will take place, yet the frightful danger attending any such hope prevents the experiment, except under the closest quarantine. The immediate treatment of bites is of the utmost importance. They should be made to bleed as profusely as possible by pressure, then thoroughly cleaned and cauterized. Fuming nitric acid is probably the best for this purpose, superior even to actual cautery, or strong nitrate of silver. The nitric acid should be applied within twenty-four hours after the bite. (Cabot. Medical News. 1899.)

Persons bitten by rabid animals should take the Pasteur preventive treatment as soon as possible. This treatment consists in the injection of the attenuated virus of Rabies, beginning with a virus so weak that infection is impossible, and gradually increasing the strength until the system resists the strongest virus. This treatment is attended with no danger, and grants immunity to the individual, except in a very few instances. For example, of 2,872 persons bitten by animals proved to have been rabid by inoculation only twenty died; a mortality of only .69 per cent.

Recent reports from Italy awaken the hope that Radium may, before long, prove very valuable as a curative agent.

DIAGNOSIS.—An early ante-mortem diagnosis in the dog is of great importance, as it is then possible to confine the

animal before the desire to bite has developed. In districts where Rabies has existed, or animals have been bitten, dogs should be most carefully observed, and any deviation from customary habits should be looked upon with suspicion, and warrant immediate isolation. In such cases, if undoubted symptoms of Rabies ensue, the animal can be destroyed, otherwise no harm has been done.

There are numerous nervous affections of the dog which simulate Rabies, and it is generally true that only a veterinarian with some experience of the disease is able to make a diagnosis. Indeed, there are many instances where a doubt as to the correctness of the diagnosis may properly exist. In such cases, and especially where persons or animals have been bitten, an absolutely correct diagnosis is of the utmost importance, and this has to be made after death. Unfortunately, a post-mortem examination does not give the desired result. It can at best only arouse, not confirm, suspicion. The cause of Rabies is still unknown, so that it is impossible to isolate it and thus make a diagnosis. Therefore, for many years animal inoculation has had to be resorted to. The method recommended by Pasteur is still used, with slight modifications. It consists of injecting directly upon, or into the brain, of rabbits or guinea pigs, a suspension of the brain or cord of the suspected rabid animal. If really rabid, the animal thus inoculated will show symptoms of Rabies sometimes as early as ten days, usually between fifteen and thirty days, though symptoms may be delayed as long as ninety days. Yet the inoculation being made thus directly into the central nervous system, symptoms appear, with very few exceptions, before they do in persons who have been bitten, and there is still time, therefore, for them to take the Pasteur preventive treatment.

For years other means of diagnosis have been sought, not only that a more rapid result might be obtained, but that unnecessary sacrifice of animal life might be prevented. For instance, very definite lesions in the plexiform and Gasserian

Ganglion have been described as occurring in Rabies, and they undoubtedly exist in the majority of cases. But they sometimes fail, and moreover, it has not been definitely established that similar lesions may not occur in other nervous disorders, so that this means of diagnosis did not prove fully successful, and animal inoculation was still a necessity.

Recently an Italian observer, named Negri, has fully described certain definite inclusions in the cells of the Ammonshorn, which he claims are protozoa, and the cause of Rabies. These bodies vary much in shape and size, and can be made out with ease only in properly fixed and stained sections of the Ammonshorn or cerebellum. Negri and others have found them present in all but a few cases of Rabies, and only in Rabies, and the assertion is that they are diagnostic.

The present extensive outbreak of Rabies in Massachusetts has given me an opportunity to carefully follow Negri's work. I confess that I was very skeptical at first, but from being a skeptic I have become a firm believer. At first it was necessary to inoculate animals to confirm the diagnosis, but my own results added to voluminous reports from abroad seem to make this step unnecessary, except in a few cases where Negri Bodies are not found in sections. I have succeeded in reducing the ordinary time of three days, necessary to obtain sections, and, therefore, a diagnosis, to less than twenty-four hours. Also, by means of impressions of cross cuts of Ammonshorn upon glass slides, I have succeeded in finding Negri Bodies in a much shorter time. In the majority of cases I feel that I can now make a diagnosis by this method in two hours after the suspected brain has reached the laboratory.

I feel that the presence of these bodies are as diagnostic for Rabies as the bacillus of Tuberculosis is for tuberculosis, or the Klebs-Loeffler bacillus for diphtheria. In fact, I believe that this means of diagnosis is as correct as any bacteriological test that we have at the present time.

Before closing, I wish to say a few words regarding pre-

vention, which is, as you all know, a thousand times more valuable than cure. It is perfectly possible to prevent Rabies, a fact that has been demonstrated time and again, and I believe the best preventive measures are the following:

First: Reduce the number of dogs as much as possible. This can be accomplished by proper license laws, strictly enforced.

Second: Limit the uncontrolled roaming of dogs by chaining or otherwise confining them, or taking them about only on the leash.

Third: Prevent them from biting. This can only be done by strict muzzling laws. Experience has shown that wherever muzzling has been well enforced Rabies has soon disappeared. The unfortunate sentiment against the muzzling of dogs is largely due to the efforts of a number of well-meaning people who consider it a cruel practice; but anyone who has had the slightest experience with muzzling will inform you that the most refractory dog becomes perfectly reconciled to the muzzle in a few days. It is indeed deplorable humanitarianism that permits the possibility of untold suffering to man and animals, that a few dogs may be saved a slight annoyance.

THE PRESIDENT: Dr. Frothingham's extremely interesting paper is before you for discussion. This Association and the Commonwealth looks to your department, Dr. Peters, for protection. We shall be glad to hear from you.

DR. PETERS: Mr. Chairman, Ladies and Gentlemen,—Dr. Frothingham's remarks on Rabies are of more than ordinary interest just now because of the prevalence of Rabies in Massachusetts at the present time, and it gives me a great deal of pleasure to be able to be here today and supplement his remarks with a few words in reference to the outbreaks during the past season.

On looking over a barrelful of old sermons a few days

ago, I find that I preached to this congregation upon the subject of Rabies in January, 1891, fifteen years ago next January. It impresses upon one the age which this Association has attained, and gives added force and significance to its deliberations.

During 1889 and 1890 an outbreak of Rabies occurred in this State somewhat similar to the one that we are now going through, and it was this outbreak that led to the discussion of Rabies at the January meeting in 1891. I remember saying at that time that "Rabies, like all epizootic diseases, is at times very prevalent, and then, after a varying duration, becomes very much less frequent, and finally is seldom or never heard of until a fresh outbreak occurs." The outbreak of 1889 and 1890 gradually subsided until it finally disappeared. For a while Rabies was practically unknown in this State. There was not a case of Rabies reported to the Cattle Bureau Office, which proved to be positive, between September, 1903, and November, 1904. That is, for a period of fourteen months, so far as is known, the State was apparently entirely free from it. There were two cases prior to November, 1904; one in September, 1903, when a dog belonging to a travelling vaudeville actor had Rabies, which may have been bitten outside of Massachusetts; the other case was a green Western horse, in July, 1903, which was probably bitten outside of the State before he was shipped here from Indiana.

Since last November several sporadic cases have been reported, and later there have been two serious outbreaks and two or three minor ones. One of the two large outbreaks was in Lowell last winter and spring; the other, which has not subsided yet, started in Northbridge the end of last July. Where an outbreak of Rabies occurs, dogs that have been exposed in the neighborhood, which are known to have been bitten or which may have been bitten, have been ordered quarantined on the premises of the owners. Counting such cases, the total number of animals which have been reported as having Rabies, or suspected of being infected with Rabies,

has been 229. Of these, 223 were dogs, one cat, one cow, three calves, and one swine. Of these 229 cases, 157 are those spoken of as being quarantined. The number of cases positively diagnosed as Rabies is 65. Dogs suspected of having Rabies and examined have proved negative in 13 cases. Thirty-three dogs have died or been killed by their owners without an examination at the medical school, and 60 dogs have been released from quarantine at the expiration of ninety days, having shown no symptoms from the time that they were exposed to a rabid animal. There are now remaining in quarantine 58 dogs.

Among the animals which have died of Rabies have been a cow, three calves and a pig. Two persons died in Lowell last spring, both of whom went to New York and took the protective inoculation furnished by the New York City Board of Health. One, a woman, died soon after returning home; the other, her father, died about a month later. These two people were bitten very severely on the face and neck, which accounts for the failure of the anti-rabic treatment in their cases.

Cases of Rabies have occurred in the following towns:

Milton,
Tyngsborough,
Watertown,
Northbridge,
Douglas,
Clinton,
Northborough,
Marlborough,
Boxford,
Framingham,
Upton,
Hopedale,
Milford,
Holden.
Leominster,
Lowell,
Weston,
Newton,
Waltham,
Grafton,
Lancaster,
Uxbridge,
Maynard,
Topsfield,
Mansfield,
Westborough,
Mendon,

Where an outbreak occurs in a town, the following notice is sent to the inspector of animals to post, with his name and the chief of Cattle Bureau's printed at the bottom:—

"A number of cases of Rabies have occurred recently among dogs in Worcester County, and it seems quite probable that more cases may occur in some of the towns. It is the duty of every one, therefore, to co-operate with the State and local authorities in doing everything possible toward the suppression of this disease.

"In towns where Rabies exists the selectmen have the necessary authority to order all dogs running at large to be muzzled, under Section 158 of Chapter 102 of the Revised Laws. A muzzling order should require dogs to be properly and efficiently muzzled for at least sixty days—ninety days would be better.

"All persons are cautioned against the danger of attempting to pet or fondle strange dogs.

"Any person noticing a dog acting in a peculiar or unusual manner should at once notify the local inspector of animals.

"If a dog should bite any one, it is unwise to immediately destroy it, if it can be secured without its doing further harm, as a dog suspected of having Rabies should be securely chained or shut up in a box stall for a few days, where it can be observed. Tying with a rope is unsafe, as the dog might gnaw the rope in two and escape. If the dog remains well, it is certain that it is not rabid, and the person bitten need have no cause for alarm. If the dog should die, or is killed on suspicion of having Rabies, the head should be sent to the Chief of the Cattle Bureau of the State Board of Agriculture, who will have it examined in order to ascertain whether it had Rabies or not. If there should be good grounds for suspecting that a dog so examined had Rabies, and it had bitten anyone, a report will be made to the person bitten, or the attending physician, in order that the injured person can go to New York for the anti-rabic treatment furnished by the

New York City Board of Health, if the patient desires to do so. If a dog suspected of having Rabies is to be killed, it is preferable to have it chloroformed when possible, as shooting injures the brain so as to render it of less value for examination.

"If a dog suspected of having Rabies bites any dogs or other animals, the animals bitten are to be quarantined by the Inspector of Animals, as provided for by law, and the owners must keep them under restraint until notice of their release is sent them by the Chief of the Cattle Bureau.

"The police or other dog-licensing authorities should be particularly stringent in enforcing the dog license law. All homeless or ownerless dogs should be killed. All persons owning dogs should be made to have them licensed, as provided for by law, and all dog owners should feel a greater sense of responsibility at this time than when usual conditions prevail."

The following notice has been sent to all owners of dogs quarantined:

Commonwealth of Massachusetts,
Cattle Bureau of the State Board of Agriculture.

NOTICE.

To Dog Owners, or Persons in charge of Dogs quarantined, in order to prevent the spread of Rabies.

All owners or persons having charge of dogs quarantined under the provisions of Chapter 90 of the Revised Laws and Chapter 116 of the Acts of 1902 are hereby notified that dogs so quarantined are to be kept securely CHAINED, or shut up in a box stall or other suitable enclosure on the premises where they are quarantined, and that under the provisions of the law they cannot remove or kill any animals legally quarantined, without the permission of the Chief of the Cattle Bureau.

As dogs suspected of having been bitten by a mad dog cannot be safely allowed to run at large until the expiration of ninety days from the time that the bite may have been inflicted, it is possible that some owners may prefer to kill animals to which they are not particularly attached, or that have but little value.

Permission to kill such dogs is hereby granted under the following conditions: An owner desiring to kill a dog in quarantine is to notify the local Inspector of Animals, or an agent of the Cattle Bureau, and either the inspector or the agent is to be present when the dog is killed and report the killing of the same to the Chief of the Cattle Bureau.

_____,

Chief of Cattle Bureau.

State House, Boston, Oct. 2, 1905.

In many of the towns where Rabies has occurred in Worcester and Middlesex Counties, the selectmen have issued orders as provided for in Section 158 of Chapter 102 of the Revised Laws, ordering all dogs running at large to be properly and securely muzzled, or else kept under restraint on the owner's premises. Muzzling orders of this kind have been issued by the selectmen of Northbridge, Douglas, Clinton, Northborough, Grafton, Uxbridge, Westborough, Mendon, Upton, Milford, Hopedale, Lancaster, Leominster and Holden. The Mayor and Aldermen of Marlborough have also ordered all dogs in that city muzzled or restrained. Where this is done, and where the police destroy all stray and ownerless dogs, much can be accomplished toward eradicating the disease.

It is probable that after Rabies disappeared from Massachusetts it was reintroduced by dogs coming from without the State, as the following instances demonstrate how it may be brought from a distance. About the first of June a bull terrier was brought to Auburndale from Wayne, Pa. Two or three days after arriving at his master's place he ran away

and was found in Weston, with a stray brindle dog with bat ears, appearing at a gentleman's place there. He had been advertised in the newspaper as lost, and the coachman caught him and returned him to his owner. After being brought home the owner noticed that the dog was not well, and took it in to a veterinary hospital in Boston, where he was informed the dog had Rabies. A dog bitten at the gentleman's place in Weston afterward developed Rabies and died. What became of the bat-eared friend that was with the bull terrier has never been known, as he afterward disappeared and has not since been heard from, but it is not impossible that he may have been bitten by the dog from Pennsylvania and afterward developed the disease and attacked other dogs, which may account for the outbreak at present in Worcester and Middlesex Counties. Another case which has recently been brought to my attention is the appearance of Rabies in Boxford, on the premises of a man who trains bird dogs. A few weeks ago a setter was brought to his place from Virginia, which later developed Rabies, although it was not known what the trouble was at the time. Later another setter bitten by this dog developed Rabies. The result is that all the dogs on the premises have been quarantined for ninety days. Another dog owned by a neighbor, bitten by the second animal that had Rabies, is also in quarantine. It is hoped that quarantining these animals will prevent the further spread of the disease in this locality.

I believe Rabies has been exterminated in England, and all dogs now brought there are not allowed to enter except upon a permit from the English Department of Agriculture, and are held in quarantine for ninety days after arrival. Rabies is unknown in Australia, for the reason that all dogs that have ever been brought there have been kept in quarantine for ninety days after arrival before being allowed to run at large. If Massachusetts was sufficiently isolated, regulations providing that no one could bring a dog into this State without a permit, and that all dogs brought here must be

kept in quarantine for ninety days after arrival, would serve to keep the State free of disease after it was again eradicated in this Commonwealth. But our position does not permit of this, as dogs could run in from neighboring States without it being possible to prevent it, and in this way some rabid animal might reintroduce the disease at any time, even if it should disappear here.

Two cases that have recently come to my attention are of interest, showing the ground that a rabid dog will cover in a short length of time. A few weeks ago a dog ran from Grafton, where we have been having trouble with this disease, to Kingston (a distance of about fifty miles), leaving home on Sunday and appearing in Kingston early Monday morning. He died with Rabies Thursday or Friday of that week. Fortunately this dog was muzzled, because of the order of the selectmen of Grafton ordering all dogs running at large in town to be muzzled. Judging from the size of the muzzle, I think the strap around his nose was sufficiently tight to prevent his having done any harm to other animals. About ten days ago a dog in the northern part of Framingham became rabid and ran to Holden, a distance of twenty-five or thirty miles. This animal bit several people, who, I believe, have gone to New York City to take the preventive treatment furnished by the New York City Board of Health.

The shortest length of time this summer in which Rabies has developed in a dog after being bitten by a rabid animal has been a little less than two weeks, I think about twelve to thirteen days, and on the other hand a period of six or seven weeks has elapsed between the time an animal was bitten and its developing the disease. As a rule, a quarantine period of ninety days appears to be ample, although rare cases have been cited where the disease has not developed until a year or fifteen months after a bite of a rabid animal. Such instances, however, are very unusual.

At the time of my discourse, nearly fifteen years ago, I presented the texts which I preached from at the end of my

homily instead of at the commencement, as is customary in most sermons. I will give you the same texts again today, as they are as good now as they were then. One is from Psalms, xxii.:20: "Deliver my soul from the sword; my darling from the power of the dog." The other is from St. Paul's Epistle to the Philippians, iii.: 2: "Beware of dogs." I give you the choice of either, or both.

THE PRESIDENT: Is there anything else to be said upon this interesting subject?

A MEMBER: Will Dr. Frothingham tell how he cauterizes?

DR. FROTHINGHAM: I am asked the method of cauterization. I have advocated the method of cauterization with nitric acid, strong, fuming nitric acid, based upon certain experiments by Dr. Follen Cabot of the New York Board of Health a number of years ago. This simply means, after the wound has been thoroughly cleaned, applying the strong nitric acid directly to the wound and allowing it to remain there.

DR. FRENCH: I would like to ask Dr. Frothingham his opinion about how much delay it would be safe to make in a suspected case before this treatment is commenced. He speaks in his paper about quarantining a dog and waiting a little time until he finds whether it is rabid or not. Now, what would be the chances of recovery between immediate treatment, supposing it was hydrophobia that affected the animal, and waiting a few days or a week?

DR. FROTHINGHAM: I think it is perfectly safe to wait for a number of days. Certainly our laboratory experience has shown us in the past that, where we inoculate rabbits or guinea pigs, and they show no symptoms of the disease for

three weeks, it is still ample time for a person to take preventive treatment. Of course, the great danger comes in the cases where the bites have been inflicted upon the face and where the bites are very severe. In those instances infection may take place almost as rapidly as it does in our experiment animals, but it cannot be quite as rapid, because in our experiment animals we introduce the virus directly on to or into the brain, whereas of course from a bite it has to travel from the periphery to the centre. As a general rule, it is perfectly safe to wait until an animal inoculated has shown symptoms; but in view of our present rapid means of diagnosis, I think it is always advisable to take no chances whatever. The moment that a report comes from a laboratory that the animal is suspected of being rabid, I think that the best thing to be done is to go at once and take the Pasteur treatment.

THE PRESIDENT: The next paper of the afternoon is one, entitled "Notes from Recent Meeting of American Public Health Association," by Mrs. Richards, whom I now have the pleasure of introducing to you.

NOTES FROM RECENT MEETING OF AMERICAN PUBLIC HEALTH ASSOCIATION.

By Mrs. Ellen H. Richards,
Instructor in Sanitary Chemistry, M. I. T.

The thirty-third annual meeting of the American Public Health Association was a notable one in several respects, besides marking the progress of a third of a century. Although the American Medical Association is an older organization, the formation of a section for the discussion of State medicine and public hygiene is of comparatively recent date, so that it may safely be said that this was the first national organization for the promotion of sanitary science and public health.

It was organized in 1872, by men inspired with enthusiasm

to do for America what the Prince Consort and Edwin Chadwick, the father of sanitation, had been doing for England. The first English Board of Health was short-lived, 1848-1854, but was followed by many volunteer organizations.

There are four names of the charter members of the A. P. H. A. still on the list. There are 29 who joined previous to 1880. Of these, five were present at the Boston meeting, one of 1874, three of 1875, of whom our vice-president, Dr. Durgin, was one (he must have been a mere lad, a precocious youth). The early members were, as a rule, naturally largely medical men, but in the eighties a few of us outer barbarians, chemists and the like (there were no bacteriologists), were admitted.

Its work fell naturally under three heads:

(1) The securing of that public opinion upon which laws depend and the enforcing of those laws. Work of health boards and government officials. This part of public health is now the chief object of the National Conference of State and Provincial Boards of Health, organized in 1884.

(2) The investigation of special sanitary problems, as car sanitation, smallpox, etc., which require the co-operation of the officers of several States or countries. For the past twenty years, water supply and sewage disposal problems have been added; the interest in these culminating in the formation of the Laboratory Section, now a most active part of the Association, bringing in chemists, bacteriologists and engineers, mostly young men laboratory-trained, eager to put their knowledge into the field. Twenty-eight papers were presented in this section. Of the present membership of about 500; 225 have joined since this section was formed in 1899.

Not only individuals, but organizations may join, libraries and Boards of Health, as such, to obtain the publications which are of increasing value. Not one Massachusetts Board of Health has availed itself of the privilege, or had up to last year. Manchester, N. H. has.

(3) The third part of the work which was fully recognized as most important by the founders, but which for a few years has been overshadowed by the rapid increase of knowledge, is the education of the public whose health is to be improved by the laws and regulations imposed. The prize essays were an example.

It is noteworthy that at this Boston meeting, besides papers on communicable disease and tropical medicine, one session was devoted wholly to methods of securing more uniform instruction and co-operation in health work, and in the papers on other days there came out constantly the fact that ignorance of the common rules of clean living was responsible for the spread of the usual contagious diseases. This was admirably illustrated in Dr. Park's study of meningitis in New York, where careless habits seem to have carried infection without question. Out of 1,500 cases known, investigation revealed the fact that two hundred of them were clearly in direct contact with other cases, and that many of these showed evidence of infection from other cases. The conclusion is drawn that the meningococci are spread by the discharges from the nose and mouth of the sick, and those in immediate contact with them (hands and handkerchiefs), or the lack of the latter.

The same thing came out most forcibly in the spirited discussion on car sanitation. The railway officials showed that they provide cleanly devices just as fast as the public will make use of them. (Indeed, it seemed as if the speakers themselves, supposedly keen on sanitary points, were more concerned about having to brush their teeth in ice water than in the possible dissemination of disease by the wholesale scattering of excreta along the track, from whence every windy day will carry the dust to cities miles away.) For one carefully guarded Pullman, 10 to 20 day coaches go over the same route.

The moral effect of restrictive measures was fully recognized, but also the value of teaching the people to take care of

their own premises. Dr. Dudley brought that out in relation to the use of personal drinking cups, and to coat-brushing on the trains. In fact, after this discussion one felt like hanging one's head in shame for this boasted American civilization.

As Dr. Chapin says, "stringent measures cannot stamp out disease." It is, then, by the education of the masses, and by that only, that we can hope to approach possible freedom from disease.

It is satisfactory to know that the wild beast can be tamed and made harmless, once he is in the corral, but that is no comfort while he is abroad. We are glad of all that the Laboratory Section can tell us of how easy it is to recognize the various cocci, or to make sewage fit to drink, but we would like to know that the restaurant cooks and waiters keep their fingers clean and that Italian laborers do not wash their soiled linen in our water supply, as was found to be the case on the New York watershed the other day.

If it is true that nine-tenths of us carry pneumonia germs all the time, it is equally true that civic cleanliness can never be forced upon a free people. Education alone can make the people take pains to avoid scattering infection.

Education, not only in the meaning of words and laws, but in the absolute necessity of habits of personal cleanliness. In the school—because habits are formed early; by public meetings and popular but correct literature, because people are influenced. We need not wait until we know the last detail. As Dr. Dudley said: "Under the false impression that sewer gas was dangerous, we made every one attend to his drains—but it did them no harm to clean up."

A few quotations will show the trend of the dozen papers on education:

"There is, however, a real necessity for the education of the layman in regard to public health matters, not only for his own good, but for the good of the community as well. It will enable him to properly appreciate preventive measures

and give the necessary co-operation to public health officials in their attempt to control communicable diseases, by securing early and correct diagnosis, etc."

"The most desirable class of people to reach at this time are educators, including school teachers, preachers and journalists. The work should be introduced into all institutions of higher education, as universities, colleges, theological seminaries and normal schools."

". . . the value of well-conducted State public health associations, conference of State sanitary officers or of schools of instruction as means toward the further improvement of the work of local health officials is presented."

". . . in ten States there are conferences or schools controlled by the central authorities, and five more are seriously considering their inauguration."

"The argument is presented that from these instructive meetings there could be a more or less gradual development of them into regular and possibly obligatory courses in sanitary science and public hygiene for health officers conducted by the State authorities."

Sanitation especially necessary; does not need a physician to attend to it, as many forms of personal hygiene require. In this time of crowded school courses it will be helpful to divide the work, allowing sanitation a place apart from hygiene.

"There is still the uneducated public to be reached, and a far harder problem is to reach a large and apparently growing class of the educated public."

THE PRESIDENT: The Association apparently assents to every word that Mrs. Richards has said.

The next paper is upon "Recent Outbreak of Typhoid Fever in Springfield," by Dr. Magrath.

THE RECENT OUTBREAK OF TYPHOID FEVER AT SPRINGFIELD.

By George B. Magrath, M. D.
Assistant to Secretary Mass. State Board of Health.

Early in September of the present year, by reason of the increasing prevalence of typhoid fever in Springfield, the State Board of Health directed that an investigation be made as to the cause of the outbreak. The writer spent some two weeks in the study of the conditions, and with the assistance of the Board of Health, the Board of Water Commissioners and the Inspector of Milk of the city of Springfield, was enabled to study the situation from every point of view. By investigating as thoroughly as possible a large proportion of the reported cases of typhoid fever, and by studying the different localities in the city in which these cases occurred, it was possible to collect a large number of facts bearing upon the epidemic.

Prior to the outbreak of typhoid fever in the latter part of July, scattering cases of the disease had occurred during the late winter and early spring, in all about thirty cases. It is not apparent that these cases have any direct bearing upon the general epidemic, although certain of them are, undoubtedly, concerned with certain foci of the disease which developed later.

The geographical plotting of the cases reported in this epidemic shows a distribution over the city such as to spare consistently the better residential districts, Indian Orchard, and the village of Ludlow. A tour of inspection showed that the regions where the cases were most numerous were those occupied by the poorer, and in many instances the poorest, people in the city. This geographical and sociological distribution, together with a survey of the water supply of the city, seemed to eliminate this from responsibility as a vehicle for contagion. The cases followed no line of water distribution, developing in localities with different water supplies.

Furthermore, the distribution did not change with alteration of the water supplied to these various regions, and entire localities were exempt from typhoid fever, although supplied with the same water as that used in the infected districts.

In Springfield the localities nearest the source of water supply, and, therefore, the most liable to infection, are Ludlow and Indian Orchard. These districts, which are probably but slightly protected by filters or boiling, were practically exempt from the disease, while in the city proper those wards lying in the most direct line of the water supply were the wards with the fewest cases. These facts seem to be wholly inconsistent with a water epidemic.

An analytical study of the cases with respect to milk supply showed it to be impossible to correlate the general epidemic with milk as a distributing agent. In no instance has the number of cases in different locations exceeded one per cent. of the families supplied from any given source.

From investigations carried on by the local Board of Health it seemed improbable that ice was a factor.

These various possibilities, upon careful study, failing to explain the epidemic, attention was directed to the closer study of the regions in which the cases were most numerous, of the relation of these regions to one another, and of the conditions prevalent within them, and, further, to the distribution of cases in time when classified according to the onset of the disease. A study of the localities in which the cases were most highly concentrated showed these to be divided naturally into groups, and a study of these groups proved them to have in common the general character of their population, for in all there was a predominance of those paying very low rent. The nationalities represented in these groups are varied.

A study of the cases chronologically throws them into periods each of about twelve days' length, with an interval of two or three days, the first from July 15 to July 29, including nineteen cases; the second, between August 7 and

August 18, including twenty-two cases; and a third, between August 21 and September 2, including twenty-seven cases. Subsequent to the latter date cases occurred with less of periodic arrangement. This periodicity seemed to point to repeated infection and suggested a vehicle of contagion by means of which this would be possible and which would be especially active in regions with a population such as has been described as existing where the cases of typhoid fever were most numerous.

Investigation of the locality in which the greater part of the cases occurred which constituted the beginning of the epidemic, in the latter part of July, showed conditions peculiarly favorable to the spread of typhoid fever by contact or by the medium of fruits and vegetables. This region is one in which the standard of living is so low as to be consistent with a high degree of uncleanliness, alike personal and domestic, and also one in which, through the existence of vaults and of other unsanitary conditions, the occurrence of any considerable number of typhoid cases is rendered a distinct menace to the community. It was found, moreover, that in this region many peddlers of fruit and of vegetables either live or do business, in the conduct of which much handling of their wares by the prospective purchasers was inevitable. It was at once evident that if any infected material was present on the hands of any persons handling fruit or vegetables, or such vegetables as are eaten uncooked, or bread, it would be transferred to any article sold in this manner. A survey of the streets in this region demonstrated that practically all of the supplies for the population of the locality were sold in this manner. Associating with these conditions the fact that in a number of instances cases of typhoid fever occurred in the families of these small venders themselves, conviction was inevitable that typhoid fever, especially in the later periods of the epidemic was due at least in considerable part, to the passing on of infection by this means. It is evident that the more or less clearly defined groups of later development might be

attributable to such a cause as this, so long as the contagion remained prevalent in the classes supplied by these venders, and it was apparent that these venders were in the habit of distributing their wares very largely in the region where these groups developed. In addition to the means of spread above outlined there has, in all probability, been operative locally in the spread of this epidemic transmission by means of flies, for it is certain that in particular localities conditions have existed highly favorable to spread by this means—open vaults, broken windows, domestic uncleanliness, coupled with the occurrence of cases of the disease, furnishing all that is required for such transmission. In certain localities of this sort there seems to have been local spread, the time relations existing between later and earlier cases tending to show an inter-relation between them.

Regarding the later periods of the epidemic as capable of explanation in the ways outlined, the explanation of the epidemic as a whole is to be sought in the study of the cases which occurred in the latter part of July in the vicinity of Sharon and Ferry streets. Investigation of these cases brought out the fact that in almost every instance the fruit and vegetable supply was obtained from peddlers—and in a considerable number of cases from a particular vender—some of whom, it was stated, were furnished exclusively from his supply. The route of this particular vender was ascertained and was found to cover every street in the region where the epidemic started and to extend into several others where the cases of typhoid fever in the Hampden County jail, an insti- particular peddler was found to be rather indeterminate, inasmuch as he obtained his produce alike from the larger markets and from farmers. There is no reason to suppose that his stock at the time of purchase was infected.

The somewhat anomalous fact of the occurrence of several cases later became prevalent. The source of supply of this tution which is a model of cleanliness and of good order,

seems the less remarkable if it be conceded that infection may be carried by flies or by other media than water or milk.

It seems to the writer highly probable that the conditions under which the inhabitants of the regions of the city where typhoid has been most prevalent live, tend to facilitate the spread of any infectious disease. In the case of typhoid fever, the exposure of infected excrement, even if it be that of a single case only, under proper seasonal conditions may in such regions lead to the spread of the disease and, therefore, constitutes a menace to other parts of the city. Not a few of the cases which are ordinarily called secondary, that is, in which the infection is from one person to another in the same family or among near relatives, are due, in all probability, to the presence of open and unsterilized vaults accessible to flies.

The study of the facts has led me to the following conclusions:

1. That the epidemic was not due to infection of water supply.

2. That the epidemic, as a whole, was not due to the distribution of infection by milk.

3. That the spread of the disease locally, to the extent of its becoming in a sense epidemic, was due to the occurrence of typhoid fever in regions physically adapted to the spread of the disease by contact and to the distribution of infection from it to other regions through the medium of fruit, vegetables and possibly other food materials infected by handling.

THE PRESIDENT: The paper is before you for discussion. Dr. Emerson, we shall be glad to hear from you.

DR. EMERSON: Mr. President, I want to say, in the first place, that in many things I agree perfectly with Dr. Magrath, because later I am going to disagree with him. It certainly has been a puzzling epidemic, and its source, as the epidemic progressed, was difficult to trace.

There are two subjects which you will almost always be sure of hearing the Springfield people talk about wherever they are. One is water, and the other is typhoid. We have, many of us at least, talked the double subject this last summer.

The cause of the early cases in the lower part of the town, as Dr. Magrath has described, is uncertain, that is, of the late July cases, and we are in doubt how the original infection occurred. We believe that every chance has been offered for a distribution to a certain extent of typhoid by contact, and very likely by flies in some instances. Very likely some of the cases have received their infection from local conditions, some from the wells possibly, one or two in boys, who may have gotten it from being in the river, and so on.

The incidents of typhoid in Springfield, as far as we have a record during the past seven years, shows on the map practically the same picture which we have had this year, only there are more cases this year; that is, there always have been more in the lower level part of the city than above; there has always been in this vicinity here and in the upper region a very similar distribution.

In regard to the water supply, as Dr. Magrath said, it is somewhat complicated, and I won't attempt to go into it in further detail than he has done.

In looking at the course of the epidemic now, and taking into account all the cases, I believe, if I heard correctly, that Dr. Magrath did not particularly take up the cases in the upper portion of the town, of which there are perhaps considerably more than were put on the map when this copy was made, with also many cases, fairly well scattered. There are about 150 cases in this epidemic.

There are certain anomalous features. For instance, a milkman who had typhoid,—I don't know for how long—distributing milk regularly from his cart, remained at his post until he went to the hospital to be operated on for a perforating ulcer. As far as we know, no cases suffered on his

route, as it was carried on by the successor. The driver of a milk team went to the hospital with typhoid and admitted, as I suppose they all do, that when he was thirsty he drank milk from any broken can, and we have been unable to trace any new cases to that particular case. One more instance. During the latter part of the epidemic a case occurred in the family of a vegetable peddler on the hill, on whose grounds there was a vault, and the air of the house of that family was certainly the densest, thickest air, if it could be called air, of any house to which I have had access. We followed him up very carefully afterward, and we have been unable to learn of any typhoid on his route. So that it is plain that anomalous conditions may prevail, contrary to what we would expect.

In regard to the water supply, I will say just one more word. During the summer months, when the large reservoir is not used, we have, as the doctor said, the pond water and the Jabish Brook water, which is furnished the town directly, with slight storage. It is true, as far as I know, that there has been very little typhoid in Ludlow. I presume there has been some in people that have had access to the water. There have been three or four developed cases in Indian Orchard, which is near the source of supply of Jabish Brook. In seeking for the cause for the epidemic, outside of many cases of contact by flies, which it seemed perfectly possible and probable that there were, the explanation that was given did not seem quite satisfactory to many of us living in Springfield as to the cause of what you might almost call our annual typhoid. We have had the same disease in the same places summers; have had the same or similar peddlers and class of population in that district. We suppose that Holyoke, Lawrence and Lynn, and other cities must have similar localities. Possibly all of our typhoid, or a large portion of it, in previous years has been caused along these lines, but, as I say, as to the cause of the most of the epidemic

it seemed to us that the question of water could not be entirely eliminated.

We then looked back over the last seven years, of which we have the reported cases month by month, and on this upper chart, which I don't think you will be able to see at a distance, are two lines. The broken line, the lower line, represents the reported cases of typhoid month by month, beginning with 1899, 1900, 1901, 1902, 1903, 1904 and the present year. The upper line represents the rainfall at Ludlow. The upper line is made in two colors, black (representing our best water) and in places red (brook or pond water). We feel that our water supply, aside from the Ludlow reservoir, is at least capable of pollution, and we know that conditions have existed and do exist showing that pollution does take place. We do not know of any case of typhoid on the water shed this year; I am not attempting to say that we do. We simply know that the water which we get from Jabish Brook and from the ponds is to a certain extent polluted.

Now, the only point to which I wish to refer is, that in the summer months, and occasionally in the winter with the heavy rains, our recurring typhoid is coincident with the use of the more polluted unstored water. The brook ran into the lower part of the reservoir all the year round up to 1904. Since then it has been turned into the upper end of the reservoir during the winter, and we have had more storage water. But the point is that in 1899, for instance, when the reservoir was empty, the source of supply was the auxiliary sources, and we had typhoid more or less throughout the year. During the next few months there was practically none, in spite of the heavy rainfall. With the poorer water, our typhoid goes up. In December of 1901, and January, 1902, was an increase in typhoid, after very heavy rains and warm periods in November. It seemed to us that, looking at the matter in a comprehensive way, in the main the cause of so much typhoid in Springfield can be very largely laid to the character of our water supply.

THE PRESIDENT: Professor Sedgwick, you are familiar with this part of the Commonwealth. Cannot you say something to us?

PROFESSOR SEDGWICK: Mr. President, Fellow-Members: It does seem as if Springfield had been selected from among all the cities of the State to teach us a lot about typhoid fever, water supply and municipal administration. Here is one of the proudest cities of our State, one of which the State is most proud, and yet, beginning with 1892, we had a lamentable epidemic of typhoid fever, and since that time there have been at least two more, the last one of which has been very interestingly and ably described by the two speakers who have preceded me.

It seems to me that any one looking at this map attentively would at first agree pretty thoroughly with Dr. Emerson. He would say that this is not a very different map from one which might be made almost any year of almost any city. That is to say, there is annually in all our cities a considerable amount of typhoid fever. I might go further and say there is a disgracefully large amount in all of our cities, as compared with the amounts, for example, in Germany and countries where greater pains are taken with all sanitary matters than we have yet been able to take. Certainly that is the character of the map, but it must be borne in mind that this map covers only a limited period. This is not the map of the year; it is a map of only a small part of the year, and it is obviously, therefore, the map of an *epidemic*, not of the total typhoid for a year.

Anyone who remembers the milk epidemic of 1892 will note at once the fact that this one is almost reversed in comparison with that. At that time the cases were all, or nearly all, in the McKnight district. There was one little centre down below in the same neighborhood as the present outbreak, but it proved that the man who had been delivering milk up there, when he got scared and was likely to be found out, began delivering it here, with the result that a crop of cases

afterward turned up below, also. It was a notable fact in that epidemic that what you might call the poorer part of the city, the less sanitary part of the city, the filthier part, was the freer from typhoid fever. In this case it is just the other way.

I think we want to remember that in all typhoid conditions, in America at any rate, there is a considerable amount per annum which we may call residual typhoid. After a city has put in excellent water supply, an unimpeachable water supply, there is still an amount left annually—a small amount comparatively—which Professor Winslow and I called some years ago, and I think it is a good term, the residual typhoid; that is to say, it is the typhoid which is sporadic and not to be readily accounted for. We don't believe that it is spontaneously generated or anything of that kind, but it does not connect obviously with milk, or water, or oysters, or anything else.

Of course, we must in this epidemic, as in all, freely grant that some of the cases belong to the residual type, and where they have come from it is not always easy to say. It may be from the small, but continuing, pollution of a water supply, especially if it is a surface water supply, as was true in the present case at least a part of the time. But after we have made that allowance, which I take it is essentially what Dr. Emerson wishes to have made, and especially after we have added to that allowance our present contention, that a surface water, with slight storage—or even with long storage, unless it is under very favorable conditions,—is still subject to pollution, and may be the vehicle of typhoid fever, I say when we have made that allowance and added that belief, which is the belief that epidemiologists, I believe, everywhere hold today, there still remains in this case a genuine epidemic, an excess over the ordinary, which is very well shown upon Dr. Emerson's chart for 1905, where, departing from the average of previous years, the line has gone away up above the ordinary.

We may grant cheerfully that some of the lower part of this line, corresponding to the similar line of previous years, may have come, very likely did come, from the unpurified surface water delivered from Jabish Brook, although against that we must always remember the absence of typhoid fever in Ludlow and Indian Orchard, supplied from the same source. Those populations, however, are small, compared to that of Springfield, and it is quite possible that there may be a few cases in Springfield without the occurrence of any in those places, granting an occasional small pollution, and possibly a continuing small pollution, of Jabish Brook. There still remains over, however, the main excess, so well shown in Dr. Emerson's chart for 1905, and especially clear when one considers that this excess covers so small a portion of the year.

It seems to me that Dr. Magrath is right in calling this an epidemic. There can be no question about that. Now, an epidemic is an excess above the ordinary; at least, it is so understood in our common language. In some places the ordinary is an epidemic, and should be so considered, but in epidemiological work we have to talk of an epidemic as an excess above the ordinary. It seems to me that Dr. Emerson has well demonstrated that excess upon his chart, and that it is obvious to any one who is familiar with typhoid epidemics on looking at the chart.

Next, of course, comes the question, What is the cause of the excess? It seems to me that here Dr. Magrath is perfectly justified in his conclusion, namely, that this epidemic, this excess, did not come from the water, because if it had so come, it is to me inconceivable how Ludlow and Indian Orchard should have escaped, as they did escape, while using the same supply. So far as circumstantial evidence goes, and that is all we have in these cases, it seems to me that the case is proved. The excess, the epidemic, must have been due to something other than water. And there is no evidence that it was due to milk. There is good evidence, on the other

hand, that it was due to filth, filthy habits, secondary, tertiary and other cases, "contact" cases, if you will—in other words, the spread of the disease by contagion and filth.

One of the most interesting things about this map is that it falls in with those maps of residual typhoid which we have for cities having good water supplies. It is the same kind of a map, the same kind of a plotting, that I have made repeatedly for cities having good water supplies, but having a residual typhoid, as they always do have; and we know that their residual typhoid is in most cases due to filthy living and to secondary and tertiary cases. What makes the case still clearer to my mind as an epidemiologist is the incidence of dates. The first thing to do in investigating any epidemic is to get the dates of attack. I take it that the other chart indicates the dates of attack, and if that is so, it bears on its face good proof that this epidemic is not a general blow from a sudden or extensive pollution of the water supply, but a slow thing, growing and getting worse as time goes on. It parallels the season admirably. It bears, as we should say, all the ear marks of a secondary infection or contact or filth epidemic, in which the filthy habits of the people are responsible for the spread of the disease.

Putting everything together, it seems to me that this is one of the most instructive outbreaks that we have ever had brought before our Association, and I consider it fortunate that a difference of opinion has enabled us to look at it carefully and see some truth on both sides. I believe that very likely some of the cases may have come from unpurified water, but that the great excess, the epidemic proper, cannot have been due to water, but must have been due to some slow, insidious spread of the disease, which went on with the season. Of course, hand to hand and finger to finger and mouth to mouth spreading is one way in which that can be done. Flies constitute an added vehicle; but I think we want to be careful and not to fix upon flies any more than we must, because it is so easy to fall back upon flies when we cannot find

anything else. The flies were probably just as abundant in some other part of the city, or nearly as abundant, as they were here, for there must have been, and were, no doubt, some parts of the city where they did not have screens, and where the flies were just as abundant. I am willing to make all possible allowance for the flies, but there still remains the fact that these people living in filth, and having filth upon their tables, filth upon their food, filth upon the vegetables which they were vending, and filth around the milk cans, filth everywhere, could easily have spread the fever by filth alone. The experience which I had in Bondsville in 1892 was of this same type. In that case I attributed it very largely to the filthy handling of food and to the playing of children in filthy gutters, which had been infected from houses having typhoid cases in them.

I think another thing stands out clearly. If I understood Dr. Magrath, there were still a lot of open vaults in Springfield. Everybody who remembers Pettinkofer and the history of Munich remembers the wonderful improvement which came in in typhoid fever when Munich introduced sewerage—before it had introduced water supply at all, and while the people were still using wells; the moment the city put in sewers and got rid of the vaults, typhoid fever fell off enormously. When good water was put in it fell off still further. Vaults are nothing but filth traps. Of course, flies have access to vaults, and as we know (that is one of the things that we have learned in the last few years), flies from vaults can serve as an added element in the carrying of the disease.

In conclusion, then, I should simply say that from my own point of view, and looking back upon Springfield with great interest, since I always do look back upon it as a seat of instruction in typhoid epidemics and a laboratory, as it were, in which Massachusetts Boards of Health might observe and learn, it does seem to me that this last epidemic is one which was most needed today to teach us those factors of the causation of typhoid fever, which are relatively more impor-

tant than they were in New England. Our water supplies are getting into fairly good condition; some of them are still bad, and we must not let up on the water supplies. But, having got these into better condition, our failures in other directions, the defective civilization which we still have, the open vaults, the dirty people, the flies and all such things, rise up and become conspicuous; and I don't know of any epidemic better than this one, so splendidly worked up by Dr. Magrath, to teach us the newer and much-needed lesson, that typhoid fever is not always spread by water.

(Adjourned.)

MUNICIPAL SANITATION.

By Charles V. Chapin, M. D.
Superintendent of Health, Providence, R. I.

FLIES AND DISEASE.—The role played by the house fly in the transmission of typhoid fever and other diseases has of late attracted much attention, and although there is little direct evidence that this is a common mode of transmission, and though there is some evidence that it is not, yet it is the fashion to lay the blame on this insect and make war upon it. Some communities have even gone so far as to legislate against the fly; thus Asbury Park has enacted the following ordinance:

Section 1. Be it ordained by the Board of Health of the city of Asbury Park, N. J., that in addition to the nuisances already defined in the ordinance to which this ordinance is a supplement, the construction, maintenance, use or continuance of any privy vault, or other receptacle in or upon the ground for human excrement in such a manner that the filthy contents thereof shall be accessible to flies, shall constitute and is hereby declared to be a nuisance; and the construction, maintenance, use or continuance thereof is hereby prohibited.

Section 2. Any person or corporation violating the pro-

visions of this ordinance shall, on conviction, forfeit and pay a penalty of $25.

In Philadelphia a resolution was recently adopted to prevent flies having access to articles of food offered for sale. It was as follows:

Resolved, That the chiefs of the divisions of nuisances, milk and meat and cattle inspectors are hereby instructed to visit all retail dealers exposing for sale in front of their properties meats, fish, vegetables, fruits, candies and cake, and to instruct the proprietors that a covering of some suitable material must be provided to protect the goods so exposed from flies and insects generally.

SANITARY ENGINEERING NOTES.

By Robert Spurr Weston, Assoc. M. Am. Soc. C. E.

*NEW WATER SUPPLY FOR NEW YORK.

This report describes plans and sources for the extension of New York's water supply,—a work that has occupied the attention of many leading engineers during the past ten years. The present Croton supply can be depended upon for only about 300,000,000 gallons per diem; and it must be supplemented by a great reservoir at Ashokam, in the Catskills, where, when other contemplated reservoirs are completed, a yield of 660,000,000 gallons per diem may be obtained.

It is proposed to develop about 250,000,000 gallons daily immediately, and to build a conduit capable of conveying the whole yield of the combined water sheds whenever they are developed. Filters having a capacity of 500,000,000 gallons per diem are to be located at Scarsdale. The water will be led across the Hudson, and a large distributing reservoir will be built at Hill View. This additional supply will ultimately be connected with Brooklyn, but during the eight years of construction it is recommended that Brooklyn should develop the Long Island ground water supply, utilizing the tracts to

*Report of J. Waldo Smith, Chief Engineer, to Board of Water Supply, 1905.

the eastward of the present sources. Staten Island, which has little or no resources of its own, will have to be supplied from Brooklyn, there being the legal barrier in the way of securing water from New Jersey—the most ready source from an engineering and economical standpoint.

Owing to the rapid growth of the city, there is urgent need for rapid progress and a large force of engineers is being drafted as rapidly as possible. Brooklyn has experienced an almost unprecedented shortage during the present year, and the same will be true in New York should the construction be delayed. There are many who fear that under the most favorable conditions there will be a shortage before the works can be put into service.

It will cost about $112,000,000 to supply the first 250,000,000 gallons per diem, and to develop the Catskill resources in full (500,000,000 gallons per diem) will require an additional expenditure of about $50,000,000.

*MANILA—NEW WATER SUPPLY AND SEWERAGE.—Contracts have been let in Manila for a new water supply, consisting of a dam, ten and one-half miles of steel pipe conduit; also a distribution system. Contracts have also been let for 51 1-2 miles of sewers.

†EDINBURGH—WATER SUPPLY.—By the completion of the New Talla Works, Edinburgh has increased her water supply by 24,000,000 gallons per diem. The works are 35 miles from the city, and consist of reservoir and filters. It is interesting to note that although the city owns over nine-tenths of the catchment basin (6,180 acres), filters were thought necessary, although within this catchment area there are only 440 acres of peat land and no surface drainage of any sanitary importance.

‡NEW MECHANICAL FILTER PLANTS.—Since the putting into operation of the mechanical filter plant at Watertown, N. Y., several important plants have been installed.

*Eng News, 54. 1900, 377.
†Eng. Record, 52, 1905, 393.
‡Eng. Record and Eng. News, 1905.

At Youngstown, O., a plant having a capacity of 10,000,000 gallons per diem has just been put into service. This plant will purify the water of the Mahoning river, much polluted with sewage. The filters are similar to those at Little Falls, N. J., and consist of 12 units, a coagulating basin, machine house and laboratory, all built of concrete and masonry. The coagulating basin provides for about three hours' storage. The whole work cost $123,000.

The new mechanical filter plant at Danville, Va., was tested quite recently by Dr. Levy of Richmond with excellent results. The bacteria ranged from 8,250 in the unfiltered and 4 in the filtered water to 550 and 2, respectively, the average being 3,600 in the unfiltered and 2 in the filtered water, respectively. The amount of coagulant used during the test averaged 1.5 grains per gallon. The guarantees of 98 per cent. reduction when the numbers of bacteria in the unfiltered water were over 3,000 and less than 100 bacteria in the effluent when the numbers were under 3,000, were largely exceeded. The plant was built by the Pittsburg Filter Company.

At Hackensack, N. J., there has just been put into operation a new filter plant of the same type as that installed at Youngstown, O. This plant is of the most modern construction, and, like the others, it is built largely of concrete. Some new and interesting features have been introduced into the design of the strainer system, and the controllers which are attached to each filter are especially well designed.

Besides the above mentioned, smaller filter plants have been installed at Winchester, Ky.; Paris, Ky., and several other localities.

In addition to the above, plans are being prepared for a 20-million gallon filter plant at Toledo, O. This plant will also be built according to modern ideas and will cost about $800,000. It is hoped to supply the city with filtered water during 1907.

With the introduction of so many filter plants whose

success is dependent fully as much upon the care with which they are operated as upon the design of the plants themselves, there come warnings from many sources against the careless and unscientific operation of these plants and the necessity for exercising supervision over many of the so-called automatic devices. For example, the reviewer has lately inspected a mechanical filter plant which has been in operation for over ten years and which is so constructed that no definite information regarding the flow of water through the filter or the amount of coagulant applied to the water can be obtained. It is unnecessary to add that this plant was not operating in a satisfactory manner.

WASHINGTON, D. C.—It is reported that the new sand filters at Washington are being gradually put into operation. Filtered water will be very welcome in Washington, as the city has suffered another typhoid epidemic during the past fall, an epidemic attributed to the water supply.

*REFUSE DESTRUCTORS.—Sacramento, Cal., and Westmount, a suburb of Montreal, are about to install refuse destructors of the Meldrum type. These destructors are typically English and their operation under American conditions will be watched with interest. The plant at Sacramento has a nominal capacity of 40 tons of refuse daily; that at Montreal 50 tons.

PROGRESS IN SEWAGE DISPOSAL.—As the result of careful and scientific experiments conducted at Columbus by Mr. George A. Johnson, contracts will soon be let for a plant to dispose of the sewage of the whole city, which will consist of settling basings, filters and effluent tanks. On account of the absence of suitable sand nearer Lake Erie, intermittent filters of the type used in New England were almost prohibited on account of their excessive cost. The process decided upon is as follows: The sewage, settled for a few hours to remove the grosser suspended matter, will be applied to trickling filters composed of coarse broken stone, at a rate of 2,000,000 gallons per

*Eng. News, 54, 1900, 317.

acre per diem. The non-putrescible effluent from these filters will then be stored in a basin to remove the suspended matter; it can then be discharged into the Scioto River without offense.

Trickling filters will be a novelty in this country, though not so in England. Their chief advantage consists in the high rate of filtration possible with them,—about twenty times as fast as that used with the sand beds. Of course, the effluent is not so good as that from the well-operated sand filter, but it is non-putrescible, and if necessary can be further purified very easily by filtration through sand at a high rate. There are many small streams in the country not used for water supply which are extremely offensive because of the small dilution of the sewage discharged into them. The treatment of the sewage by septic tanks, trickling filters and subsiding basins, as proposed at Columbus, offers a most promising solution of the difficulties associated with such conditions.

*STANDARDIZATION OF PLUMBING FIXTURES. —The antiquated British Plumbing Regulations prepared many years ago by the Local Government Board are to be revised by a committee representing British architects, engineers, waterworks managers and plumbers. In England it is thought best to depend upon standard fittings and frequent inspection to prevent waste of water and to insure proper tightness of drains. In the United States the general opinion is that waste of water can be prevented better by the use of meters, while the plumbing regulations in many cities have been framed for the benefit of plumbers rather than in the interests of public health and convenience. Some American cities, for example, prohibit constructions which are absolutely insisted upon in others. In the reviewer's opinion it would be much better to insist upon principles being adhered to, rather than that certain standard fixtures be used, as it would be better to place the burden for the design and maintenance of the fixtures upon the householder, his archi-

*Eng. Record, 52, 1905, 466.

tect or his plumber, than to leave it to some commission composed largely of contractors and plumbers, whose decision is too often apt to impose unnecessary hardship upon the householder.

LABORATORY NOTES.

By Frederic P. Gorham.
Anatomical Laboratory, Brown University. Bacteriologist, Providence Health Department.

STANDARD METHODS.—Since the appearance of the last number of this journal the Report of the Committee on Standard Methods of Water Analysis of the American Public Health Association has appeared.* This report deserves the careful attention of all who have to do with the sanitary study of water whether from the chemical or bacteriological standpoint. Since the appearance of the first report of this Committee in 1897 the standard methods then proposed have been submitted to the most careful tests by all the principal laboratories of this country. It can safely be said that the present revision of this report, which has resulted from this careful testing of the proposed methods, is as complete as any such report can ever be. It is impossible here to review or discuss any of the changes and additions which appear. It can only be said that these Standard Methods are now in a shape which warrants their adoption by all who wish their results to meet the approval of the best workers along the lines of water analysis.

It is hoped that the Preliminary Report of the Committee of the Society of American Bacteriologists, on Methods for the Identification of Bacterial Species which is intended to supplement and extend the report of the committee on methods and in no wise to conflict with it, will also receive the careful attention of working bacteriologists. After this is thoroughly tested and revised a final report will be made

*The Journal of Infectious Diseases, 1905, Supplement No. 1, Page 1.

which will put the description of species on as secure a footing as the other report has put the methods.

With the general adoption of these two reports and the standard methods which they involve, bacteriology in general and water analysis in particular, will be in a condition in America far ahead of the chaotic condition which still prevails in similar work in Europe.

VOGES AND PROSKAUER'S REACTION.—In a careful paper on the "Lactose-Fermenting Bacteria in Faeces," by Alfred MacConkey, M.B., D.P.H.,† we find some interesting data regarding Voges and Proskauer's reaction. "The caustic potash red reaction" was first mentioned by Voges and Proskauer in a paper on the "Bacteria of Haemorrhagic Septicaemia."‡ They describe it thus (speaking of a Schweinepest bacillus isolated by Voges): "On the addition of caustic potash we observed a new and interesting color reaction. If the tube be allowed to stand for twenty-four hours and longer at room temperature, after the addition of the potash, a beautiful fluorescent color, somewhat similar to that of a dilute solution of eosin, forms in the culture fluid, particularly at the open end of the tube exposed to the air. . . . We are compelled at present to consider this new reaction as specific for the bacillus in question as none of the remaining bacteria, notwithstanding the variety of culture media used, gave it. Neither does the Bacterium coli give the reaction, so that we have here a further most valuable means of differentiation from these inhabitants of the intestine."

Durham¶ refers to this reaction and states that it may appear within a few hours after adding the potash. Freeland Howe, Jr.,[a] in "Notes on B. coli," refers to those organisms which produce a red color in the closed arm when standing twenty-four hours after the addition of potash, and says "just what produces this red color is not known," and "if it were possible to determine the species to which a culture

†Journal of Hygiene, 1905, V, 333.
‡Leitschr. f. Hygiene, 1898, XXVIII, 20.
¶Journal of Experimental Medicine, 1900-1901, 354.
a Centralbl. f. Bakt. I, Orig., 1904, XXXVI, 484.

characterized by this color belongs, it would be of decided advantage to bacteriologists engaged in water analysis." . . . MacConkey concludes that though this reaction has been looked for in the cultures of a large number of organisms it has only appeared "in the case of the B. lactis aerogenes group and B. cloacae group, thus entirely confirming Durham's observation that it was a point of difference between the aerogenes group and the coli enteritidis and typhosus groups. It also helps to distinguish the B. pneumoniae (Friedlander) from the B. lactis aerogenes."

A STANDARD METHOD FOR THE DETERMINATION OF THE ORGANIC NITROGEN IN SEWAGE BY THE KJELDAHL PROCESS.—Earle B. Phelps suggests* the adoption, as a routine procedure in the analysis of sewage and sewage effluents, of the Kjeldahl process for the determination of the total organic nitrogen. This change seems necessary because of the untrustworthy nature of the so-called albuminoid ammonia figures. As a result of his study and at the suggestion of the Committee on Standard Methods of the American Public Health Association, he outlines a standard method of procedure which it is believed will yield accurate results, and which at the same time is sufficiently rapid and simple in manipulation to permit its adoption as a routine procedure in sewage analysis.

IMPROVEMENT IN THE TECHNIC OF THE INDOL TEST.—An improvement in the technic of the indol test which McFarland and Small have worked out† is exactly the same as one already published by Grubbs and Francis.‡ It is an application of the ring test, made by adding chemically pure sulphuric acid to the culture to be tested, in the proportion of one drop to every cubic centimeter of the culture, shaking, and then allowing the solution of potassium nitrite to trickle down the side of the tube and form a layer on the heavier culture and acid. The red color of the

*The Journal of Infectious Diseases, Supplement No. 1, 1905.

†The Journal of Infectious Diseases, Supplement No. 1, 1905, 325.

‡Bulletin of the Hygienic Laboratory of the U. S. Public Health aed Marine Hospital Service, 1902, No. 7, Page 3.

nitroso-indol makes its appearance at the line of contact of the two fluids.

VETERINARY HYGIENE.

By Veranus A. Moore, M. D.
Cornell University, Ithaca, N. Y.

SERUM THERAPY IN DOMESTICATED ANIMALS.—At the eighth International Veterinary Congress held in Budapest, in September, Leclainche presented a very exhaustive paper on the subject of serum therapy in the lower animals. The data acquired from the application of methods created by Von Behring in reference to the use of serums, he summarized as follows:

1. GENERAL PRINCIPLES OF SEROTHERAPY.—The introduction into an organism of agents or substances capable of influencing the anatomical elements, particularly the phagocytes, provokes there, under certain conditions, the elaboration of substances of an immunising or resisting character, which pass into the plasmas, especially into the serum of the blood.

The immunising serums have a vigorously specific action; they are active only with regard to the species, or varieties, of microbes or chemicals, which have served in their preparation.

The variability of certain pathogenic microbe-forms, necessitates the employment of polyvalent serums, prepared from as considerable a number of families as possible.

The identification of a disease by the preventive, or curative, effects of a specific serum, is only possible with a pure infection.

The passive immunity conferred by the immunising serums establishes itself very quickly, but does not last long. These two essential characteristics point out the mode of utilizing it.

(a) The serum is, above all, preventive; it permits of intervention among the contaminated, under conditions where vaccination, properly so-called, would be inefficacious and dangerous.

(b) The rapidity of the immunisative impregnation is so great, that the serum proves frequently curative.

(c) An active immunity can sometimes be secured by the association of the serum and the virus; the process is designated by the name of sero-vaccination. It is also known as the "simultaneous" method.

2. PREVENTIVE SEROTHERAPY.—This method is absolutely without danger, either to those treated or their neighbors; but it protects for a few days only.

It is indicated under certain circumstances.

(a) To avoid temporary danger of infection (tetanus, malignant oedema, etc.); to protect subjects exposed temporarily, as at fairs, shows, in transports, etc.

(b) At the beginning of an epizootic, in order to circumscribe the first centres of infection (rinderpest, aphthous fever, sheep-pox), and to avoid general slaughter.

(c) To protect effectives, which it is indispensable to safeguard (work of urgent necessity, cavalry, etc.), by repeating immunisative injections at short intervals.

(d) To save the contaminated, in regions infected by an epidemic of rapid diffusion (chicken cholera, red murrain, sheep-pox, etc.).

3. SEROVACCINATION.—An injection of immunising serum mobilises the defences of the organism; a virus, hardly attenuated at all, or normal, associated therewith, confers a durable active immunity.

One may: First, innoculate successively with the virus and the serum; second, innoculate at the same time at different points with the serum and the virus; third, innoculate successively with the serum and the virus.

The utilization of each of these processes is determined by the respective powers of the serum and the virus.

Another mode of utilization consists in the injection of the mixture of serum and virus. It necessitates the employment of serums obtained pure, without the addition of antiseptics, such as are prepared in France. This method secures an evident simplification of work. The mixture is made at the moment of use, and a single injection suffices.

Serovaccination is already applied in cases of rinderpest, red murrain anthrax, sheep-pox, etc. It lends itself to the most diverse combinations and adapts itself to every exigency.

4. CURATIVE SEROTHERAPY.—This constitutes the true "specific medication."

The curative power of the serum varies, according to the activity of the toxins elaborated, the rapidity of their resorption and the stability of the combinations formed.

In tetanus the serum can neutralize the circulating toxin; it is powerless with regard to the toxin fixed upon the nerve-cell.

In a general way, the serums are active during the first phases of the microbic invasion; the sooner the treatment intervenes, the more certain and more complete the cure.

The effects are only evident in pure infections; the complications of secondary infections would demand the employment of serotherapies corresponding.

The magnificent results obtained in treatment of diphtheria and red murrain permit the anticipation of an indefinitely extended application of serotherapic methods.

PROPHYLAXIS OF TUBERCULOSIS IN CATTLE.—At the same Congress, de Jong presented an instructive paper on the prophylaxis of tuberculosis of cattle. His conclusions are as follows:

1. The prophylaxis of tuberculosis among domesticated animals is desirable, not only from the point of view of agriculture, but from that of public health.

2. It should be effected, as much as possible, by the State; and this applies especially to cattle tuberculosis.

3. State prophylaxis requires first of all, compulsory notification of dangerously-diseased cattle, their slaughter as soon as possible, with compensation paid to their owners.

4. As far as possible, the State should lay down regulations for avoiding the milk danger.

5. Agriculturists should be taught the means of combating tuberculosis, they should be stimulated to take other measures for extirpating cattle tuberculosis; they should, that is to say, take care to breed healthy young stock, to guard against contagion from purchased animals, to stable their stock in roomy, well-ventilated stalls, etc.

6. It is desirable that the efforts of agriculturists to extirpate bovine tuberculosis should be aided, under certain circumstances, by the State.

7. Tuberculin is an excellent means of detecting the presence of tuberculosis among cattle.

8. The prophylaxis of swine-tuberculosis stands in no present need of special State measures, unless it be possible to apply those for combating the milk danger. In certain cases it should still be left in the hands of agriculturists, with or without State aid.

9. The prophylaxis of poultry tuberculosis may be left to private initiative.

10. The researches concerning von Behring's protective inoculation should in any case be continued.

CANADIAN NOTES.

By John A. Amyot, M. D., Ontario Board of Health.

REGULATIONS FOR SUMMER RESORTS.—The Provincial Board of Health of Ontario, acting on the report and recommendations of two of their officers on the conditions found in the Lake districts of Ontario, frequented in the holiday seasons by people from all over America, are formulating regulations to govern the health officers of the municipalities looking after these districts. In the Muskokn lake district alone over 10,000 outsiders find a summer outing place. A great number of their houses are situated on islands, all on the lake borders. It is surprising to find what people will do if not prodded by some limb of the law. At one place visited a multi-millionaire was pumping his water supply from the lake, not more than 100 feet away from his sewer outlet, with only a boulder wall intervening. At another place, the sewer pipe and the water pipe was bound together, the sewer pipe ending in some sand at the water edge, the water pipe going out fifteen feet farther, to take in the water for the house. Privies on the water edge used to be very common, but now these are very few. The regulations to be formulated are to govern such conditions. In general, dry-earth closets are to be recommended, and garbage is to be removed at frequent and fixed intervals. Where the establishments are large and sufficient, and earth of a proper kind can be got, septic tanks with subsequent sub-surface irrigation are to be recommended, especially in the case of hotels and boarding houses. The steamboats on the lake will not be allowed to empty closets or garbage into the lake, but must cremate at fixed points. Attempt will probably be made to have special legislation passed to enable such localities to incorporate themselves so as to apply their taxes to a betterment of their hygienic conditions and not all spent on roads and public works for the neighboring townships that do practically nothing for the resorts.

POLLUTION OF A PUBLIC WATER SUPPLY.—At Brampton, Ont., one Dyer was brought before the police magistrate for violation of the Public Health Act of Ontario, in allowing his house and barn-yard refuse to drain into a ten-acre lake, which served as a source of water supply to the town. He was fined $1.00 and had to pay costs, and was ordered to abate the nuisance, though it had existed before the town took the water and has continued since, a matter of some twenty-five years.

TORONTO HOSPITAL. — The subscriptions towards the erection of a new general hospital in Toronto have come up to the million-dollar mark, with all imdications that it will reach a million and a half very soon.

WARDS IN GENERAL HOSPITALS FOR THE INCIPIENT INSANE.—Following on the recommendations made to the Provincial Secretary by the Convened Asylum Superintendents, the Toronto General Hospital has put aside one of its wings for the reception of the incipient insane, where they can get treatment without the formulary required and the publicity consequent on an application for admittance to the ordinary Asylum for the Insane. Many cases, it is thought, will be saved a lifetime of insanity by an early and non-stigmatizing treatment, such as could be given in a hospital.

MINISTER OF HEALTH IN THE DOMINION HOUSE.—A new committee of six, with Dr. Lachapelle of Montreal as chairman, has been appointed to advance this idea, and see if they cannot retrieve the ground lost last year. The Cabinet look on the proposal rather favorably. The hopes are that they can be induced to put their approval into actuality.